



## **The forcing of coastal sea-level rise patterns in the North Atlantic and the Mediterranean Sea**

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Sea-level trends derived from North Atlantic and the Mediterranean Sea tide gauges have been re-evaluated with a common reference period (1960-2000) and with the atmospheric component of the observed sea level variability quantified and removed by means of regional barotropic ocean models forced by wind and atmospheric pressure. The atmospherically forced trends are important and have values of  $-0.2 \pm 0.1$  mm/yr in the North Atlantic (west coast),  $-0.2 \pm 0.2$  mm/yr in the NE Atlantic,  $0.3 \pm 0.4$  mm/yr in North Sea and  $-0.7 \pm 0.1$  mm/yr in the Mediterranean. The residual sea-level trends corrected for post-glacial rebound processes are  $0.9 \pm 0.4$  mm/yr in the Mediterranean,  $1.1 \pm 0.6$  mm/yr in the NW Atlantic,  $1.3 \pm 1.0$  mm/yr in the NE Atlantic and  $1.3 \pm 0.8$  mm/yr in the North Sea. Atmospheric forcing is partly responsible for the observed patterns of sea-level rise and for part of the observed sea level acceleration during the 1990s. The residual trends have further been corrected for the influence of the steric effects. In the Mediterranean removing the steric component increases the trends by 40% and makes them consistent with the Atlantic trends. The remaining sea-level rise rates are due to mass addition and their spatial pattern in the region can be related to Greenland ice-melting rates.